

WHAT IS CLAIMED IS:

1. An inductor comprising a carbon nanotube and/or carbon nanofiber synthesized in a shape of a coil.

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2. An inductor as claimed in claim 1, wherein the carbon nanotube and/or carbon nanofiber is synthesized between catalysts fixed at desired locations on a substrate.

10 3. An inductor as claimed in claim 2, wherein the catalysts are transition metals or alloys of transition metal.

15 4. An inductor as claimed in claim 3, wherein the transition metal is one selected from the group consisting of iron Fe, nickel Ni, and cobalt Co.

20 5. An inductor as claimed in claim 1, wherein the carbon nanotube and/or carbon nanofiber is synthesized by one of a thermal decomposition method, a catalyst thermal decomposition method, a plasma vapor deposition method, and a hot-filament vapor deposition method.

25 6. An inductor as claimed in claim 1, wherein the carbon nanotube and/or carbon nanofiber is doped with elements such as phosphorus P, boron B, silicon Si, and nitrogen N.

7. An inductor comprising an aggregate of carbon nanotubes and/or carbon nanofibers, in which the carbon nanotubes and/or carbon nanofibers respectively synthesized in a shape of coils are compressed.

8. An inductor as claimed in claim 7, wherein the carbon nanotubes and/or carbon nanofibers are synthesized by one of a thermal decomposition method, a catalyst thermal decomposition method, a plasma vapor deposition method, and a hot-filament vapor deposition method.

9. An inductor as claimed in claim 7, wherein the carbon nanotubes and/or carbon nanofibers are doped with elements such as phosphorus P, boron B, silicon Si, and nitrogen N.

10. An inductor comprising a complex of carbon nanotubes and/or carbon nanofibers and a matrix such as an insulator, a ceramic, and a semiconductor, the carbon nanotubes and/or carbon nanofibers being synthesized respectively in a shape of a coil.

11. An inductor as claimed in claim 10, wherein the carbon nanotubes and/or carbon nanofibers are synthesized by

one of a thermal decomposition method, a catalyst thermal decomposition method, a plasma vapor deposition method, and a hot-filament vapor deposition method.

5           12. An inductor as claimed in claim 10, wherein the carbon nanotubes and/or carbon nanofibers are doped with elements such as phosphorus P, boron B, silicon Si, and nitrogen N.

10           13. An inductor as claimed in claim 10, wherein the matrix is ferrite.

15           14. An inductor as claimed in claim 10, wherein the complex further contains magnetic powder such as ferrite powder added in the complex.

20           15. An inductor as claimed in claim 10, wherein the complex further comprises a magnetic layer such as a ferrite layer applied on a surface of the complex.

25           16. An inductor as claimed in claim 10, wherein an inductance of the inductor is adjusted by adjusting a ratio of compounding the matrix and the carbon nanotubes and/or carbon nanofibers.